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SHIPBUILDING *and* SHIPBUILDERS
of
BRITISH COLUMBIA
With ALLIED INDUSTRIES

Edited by AITKEN TWEEDALE

For

The TOWER PUBLISHING COMPANY

Tower Building

VANCOUVER

British Columbia

Telephone Sey. 9593

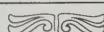


ANNUALLY

Number One

1918

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EDITORIAL



IT HAS been felt in the circles connected with shipbuilding in this Province, that an annual publication in the form now offered under the title of "Shipbuilding and Shipbuilders of British Columbia, with Allied Industries," dealing with the activities of the industry, would have a distinct value as a record of achievement and advancement from year to year. Such a publication, suitably produced, should prove of advantage to British Columbia in advising the outside world of the ever-widening field of our efforts, and so attract interest and following capital for the furtherance of this and kindred industries.

THE first issue of this work may be best described as tentative; a conscientious effort to establish some such record as before mentioned. The publishers had hoped to include full descriptions of all the shipbuilding yards in the Province; but the necessary absence of so many of the Chiefs in the East, combined with the difficulties which attend the first production of any industrial work, rendered the plan abortive in this first issue. It is hoped to include such in the 1919 edition, together with a resume of activities in all allied branches, and a list of work completed by each firm concerned.

ONE hundred and thirty years ago, the little "Northwest America," a vessel of some forty tons, was launched at Nootka Sound, on Vancouver island; an early harbinger of the fleet of big tonnaged ships sailing into the ports of the world today from the shores of British Columbia. This launching, with incident attending, nearly provoked war between England and Spain; to-day, the tonnage from our shipyards is utilized for the purposes of transportation of munitions of war and food stuffs to aid the common cause against a foe more ruthless than ever was Spain even at the height of her power, as well as for the assurance of supplies to neutral States.

WHEN the "Northwest America" was built, the shores of this Province were in a primeval state; the great sullen forests stretched to the water's edge, undisturbed by prophetic sound of the future woodman's axe; the bounteous mineral stores of the coast and interior lay virgin and waiting the touch of the great divining rod—Commercial Need; while the silence over the waters was broken only by the touch of the Indian paddle, or the cry of a sea bird.

AND while, from that date to the present, the scene of former silence has been changed to one of bustling activity in many great industrial branches, it remained for the year 1916 to witness the opening of a future in one branch, whose activities would, in the short space of two and a half years, spread over all suitable districts along our coast, and provide profitable occupation for thousands, while establishing an industry which shall prove a source of wealth to British Columbia, an honour to the Dominion, and one of the bulwarks of the Empire.

IN the summer of 1916, there was but one ship under construction; from that time onward, so appreciated have been the qualities of workmanship, craftsmanship, and honest endeavour displayed by the firms engaged in building, the business has grown by leaps and bounds. Since January, 1917, some fifty vessels have taken the water from British Columbia yards, and one can scarce open the daily papers without reading of another actual or prospective launching.

ON September the twenty-eighth, this Province, through the Port of Vancouver, set two Canadian records, and established herself as the premier shipbuilding district of the Dominion. The first record being the double launching of deep sea vessels of any size in the Dominion—the "War Storm," 4,800 tons, from the Wallace Shipyards, and the "War Noble," 8,800 tons, from the Coughlan Yards. The second record is one of rapid construction, the "War Noble" having taken only 63 working days to complete, being five days less than the "War Chief," the previous vessel off the ways of this Yard.

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THERE is something intensely exhilarating about these records; a feeling that the good work so proceeding will not be permitted to flag, but will carry us on with increased production and purpose in the van of Canadian Shipbuilding, to that great era which shall establish us as the owners of a Merchant Marine second to none among the Maritime nations.

ONE of the most encouraging signs pointing to the success of shipbuilding in this Province, is to be found in the orders from outside Governments and private firms—not only those definitely placed with new concerns, such as the Cholberg Shipyard, Victoria, which is now established and working at full pressure, but also impending orders, of which one may not speak more decidedly than to say the mere ratification is alone needed to assure commencement of operations.

THESE orders, accounting for about sixty ships, are mainly for wooden vessels, and arrive at a most opportune moment, for at the conclusion of the Imperial Munitions Board construction campaign of wooden ships, it was feared by some the industry might at least suffer considerably. Happily the aforementioned new business was so quick and active that British Columbia yards are at this time almost more than kept supplied.

“FAMILIARITY” and “contempt” are so associated in the old proverb, it is well we in British Columbia should view our magnificent forests with a new eye; a more far-seeing gaze and appreciation of what their proximity and value mean to us and to Canada in the future of Wooden Shipbuilding.

BRITISH COLUMBIA has the only timber that can be profitably used in the construction of ships of over two thousand tons—that is to say, ocean-going craft. Such ships are in demand, and capable (as proved by those built here, and now at sea) of making good returns. A little thought on this fact will bring in its train the allied one that in the construction of wooden ships practically all the money is spent on local labour and local material. The question of labour conditions is, of course, actually and definitely interwoven with this subject and the future. We shall not treat of it here, as a clear exposition of the same is given by Mr. John R. Duncan in his masterly article on “The Maintenance of Steel Shipbuilding,” which will be found in another portion of this work.

APROPOS the quality of workmanship in vessels turned out from Vancouver (and the same will apply to all British Columbia yards), we give the following extract from a report in the Vancouver Daily Province, of the farewell banquet tendered to Captain J. Nelson Craven, on the eve of his departure for the Motherland. In reply to an address by Mr. James Cant, stating he hoped Captain Craven would prove a good ambassador, Captain Craven replied “. . . . With regard to ‘ambassadors,’ the ships sent from here were the best ambassadors one could want. When he reached home he knew he would find that a very pleasant surprise had been experienced there in the quality of the ships sent. The ‘War Power’ was the last argument in this regard. . . .”

SURELY as high a testimonial and encouraging a forecast as the most optimistic could desire!

We feel sure the reader will find food for thought in the articles included, written as they are, by authorities on each subject.

FOR the kindly interest vouchsafed to the subject of this Annual, and the articles so willingly and generously contributed, we beg to tender our hearty thanks to Messrs. John R. Duncan, E. H. Beazley, James Lightbody, L. de Merrall, J. H. Hamilton and B. Dubois Phillips; also to Mr. A. J. T. Taylor for the loan of an article on Concrete Barges and Ships, by J. E. Freeman.

The Publishers desire to express appreciation of artistic and convincing work specially produced by the Dominion Photo Company; the Cleland-Dibble Engraving Company, and the Printers.

The Liner She's a Lady

1894

From "Collected Verse of Rudyard Kipling"

The Liner she's a lady, an' she never looks nor 'eeds—
The Man-o'-War's 'er 'usband, an' 'e gives 'er all she needs;
But, oh, the little cargo-boats, that sail the wet seas roun',
They're just the same as you an' me a-plyin' up an' down!

*Plyin' up an' down, Jenny, 'angin' round the Yard,
All the way by Fratton tram down to Portsmouth 'Ard;
Anythin' for business, an' we're growin' old—
Plyin' up an' down, Jenny, waitin' in the cold!*

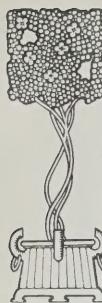
The Liner she's a lady by the paint upon 'er face,
An' if she meets an accident they count it sore disgrace:
The Man-o'-War's 'er 'usband, and 'e's always 'andy by,
But, oh, the little cargo-boats, they've got to load or die!

The Liner she's a lady, and 'er route is cut an' dried;
The Man-o'-War's 'er 'usband, an' 'e always keeps beside;
But, oh, the little cargo-boats that 'ave n't any man,
They've got to do their business first, and make the most they can!

The Liner she's a lady, and if a war should come,
The Man-o'-War's 'er 'usband, and 'e'd bid 'er stay at home;
But, oh, the little cargo-boats that fill with every tide!
'E'd ave to up an' fight for them, for they are England's pride.

The Liner she's a lady, but if she was n't made,
There still would be the cargo-boats for 'ome an' foreign trade.
The Man-o'-War's 'er 'usband, but if we was n't 'ere,
'E would n't have to fight at all for 'ome an' friends so dear.

*'Ome an' friends so dear, Jenny, 'angin' round the Yard,
All the way by Fratton tram down to Portsmouth 'Ard;
Anythin' for business, an' we're growin' old—
'Ome an' friends so dear, Jenny, waitin' in the cold!*



YARROWS, LTD.

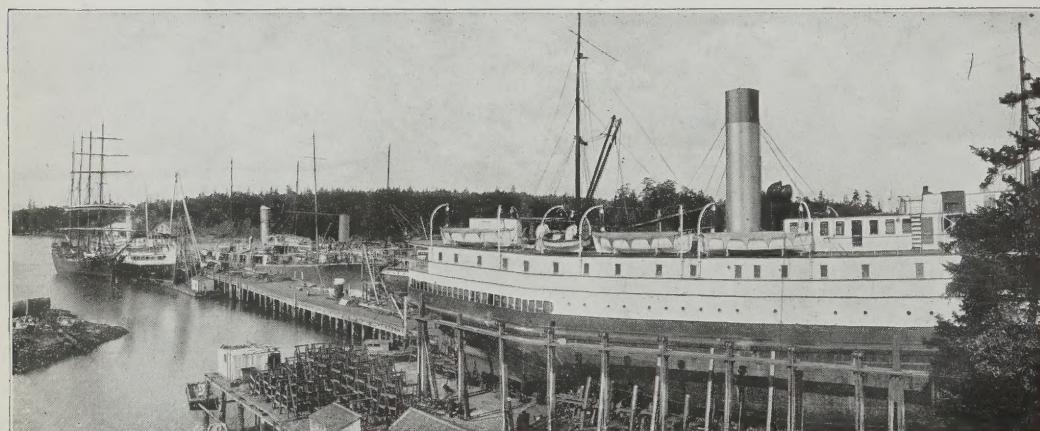
ESQUIMALT

ASSOCIATED WITH YARROW & CO., LTD., OF GLASGOW



In January, 1914, Yarrows Ltd., an offshoot of the famous Old Country shipbuilding firm of Yarrow & Co., Ltd., took over the shipbuilding yard of the B. C. Marine Railways Co., Ltd., at Esquimalt, near Victoria.

The plant is situated at Langs Cove, Esquimalt Harbour, adjoining the site of the Government Dry Dock, and covers an area of 8 acres.



The yard is specially equipped to cope with ship repair work, and the facilities of the plant have been steadily improved and added to, and at present comprise of a Marine Railway for the accommodation of vessels up to 315 feet in length and 2500 tons displacement; larger vessels up to 480 feet being accommodated in the Dry Dock.

There is a wharf over 500 feet long, which can accommodate vessels on both sides. The wharf is equipped with shearlegs capable of lifting 60 tons, and there is also a 10-ton floating derrick with a 90-ft. boom, a floating compressed air plant, and other equipment.

The yard is equipped with an up-to-date machine shop, boiler shop, joiner shop, pattern shop, foundry, coppersmith and pipe shop, oxy-acetylene welding plant, and galvanizing plant.

The following is a description of some of the work that the firm has lately carried out:

New Work

Four steel sternwheel shallow draft vessels, 132 feet long and 32 feet beam, have been completed and shipped to India, and one of larger dimensions is at present under construction.

Repair Work

A large amount of important naval repair work has been executed for the Imperial, Canadian and Japanese governments.

There has also been a large number of other important repair jobs carried out. The following may be mentioned:

One of the G. T. P. steamers, the repairs of which necessitated the removal and renewal of the entire bottom for about 180 feet, and the vessel straightened up.

The S. S. "Niels Nielsen," an 8,800-ton cargo vessel—extensive bottom damage repairs, which necessitated the removal of a large number of plates.

Another case is that of a new fully laden cargo vessel of 8,800 tons, which was brought back from sea in a disabled condition, and fitted with a new 18-ft. diameter manganese bronze bladed propeller. This propeller was cast, fitted, and the ship made ready for sea again within a week, without disturbing her cargo, the work being carried out by building a wooden cofferdam around the vessel's stern.

This cofferdam has again been used for repairing a propeller, and carrying out a survey on the stern frame of the S. S. "Hanna Nielsen."

The "Hanna Nielsen" arrived, fully laden, in a disabled condition, and was repaired and able to proceed again to sea after only 20 hours' delay.

Another vessel which has lately been repaired is the S. S. "Gray." This boat was badly damaged and her back broken. The repairs necessitated the removal of about 37 plates, and the lining up and straightening of the ship, and the removal of the stern frame.



The G. T. P. vessel "Prince John" has also been on the ways for general overhaul and repairs due to stranding.

Considerable bottom damage repairs were carried out to the S.S. "Tees" and to the Government steamer "Galiano."



This illustration shows a large L. P. cylinder, the casting of which weighed 8½ tons; one of the H. P. cylinder castings being made for the U. S. Emergency Fleet Corporation, and one of the large propellers being made for the Imperial Munitions Board.

The oil tanker "El Lobo" has just left for sea after undergoing very extensive repairs to bottom damage due to stranding.

The S. S. "Canada Maru" is now undergoing very extensive repairs due to stranding. The repairs necessitate the removal of about 140 plates.

Wallace Shipyards Ltd.

ESTABLISHED 1898

*Builders of Steel Steamers and Marine Engines
Iron and Brass Founders*

*Particularly well equipped for expeditiously
and economically carrying out ship repairs,
having Two Docks, Machine, Coppersmith,
Tinsmith, Pattern, Forge, Boiler & Plate Shops*



Office and Works :

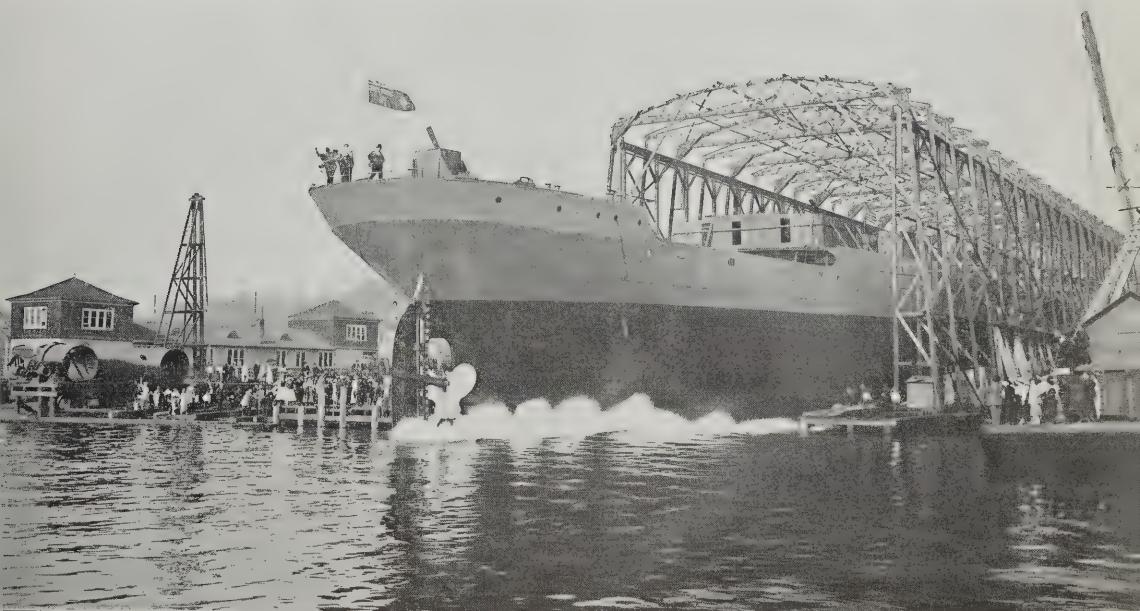
North Vancouver, British Columbia

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BUILDERS OF THE FIRST OCEAN-GOING STEEL STEAMER IN CANADA

“ HERE SHE COMES !”



Launching the S. S. “ War Storm ” from the Wallace Shipyards
North Vancouver, B. C. : : : : : : : September 28th, 1918

Steel Shipbuilding

AS

A PERMANENT INDUSTRY IN B. C.

BY JOHN R. DUNCAN, *Managing Director.*

VULCAN IRON WORKS, LTD., VANCOUVER.

Let the Government Arrange Conditions to Balance Exchange Rate—Cultivate the National Outlook—Take Inspiration from Wonderful Record of the Motherland—Co-ordination and Co-operation between Government, Employers, and Labour—Boy Apprentices and Technical Education—Belief in Ourselves and Resources Will Aid Success.

Shipbuilding in British Columbia after the War

Can British Columbia continue to be a factor in Shipbuilding after the war, under the most ordinary conditions, when contracts are comparatively scarce and prices low? Yes, if British Columbia will appreciate it is a long way from anywhere and create an atmosphere of willingness to get down to business, realizing that all great businesses have been built up by hard work and sacrifice, combined with careful, scientific management.

Steel and the Rolling Mill

With the submarine campaign going full blast in 1916, surely it was obvious that we had to build ships in this country and would require steel; yet a good serviceable rolling mill was allowed to cross the line. I cannot give confirmation, but have always thought that the Dominion Government must have had this mistake in mind when they made their final deal with the Dominion Iron & Steel Company, which at least has *some* Canadian capital in it.

This Company has a great responsibility, and it is to be hoped its outlook will be big; that it will use every known—yes, and unknown—method to place itself on the steel map—not as a sluggish, contented with profits, institution, but as an organization chock full of energy and new result-getting ideas and full appreciation of its national importance. It should not think of Canada as an industrial dependency of the U. S., but should help Canada hold a proud place in the steel world.

Such an opportunity never was presented to any Canadian corporation. The men they keep at the top will have a whole lot to do with it, and we must not forget that Andrew Carnegie is British, but probably his salesmen were American. A good combination!

Let the government with the ships it controls combine with same a visualizing of the shipbuilding situation in the big Canadian sense; following this, an arrangement should be made for shipping steel from the Nova Scotia mill or Eastern Seaboard on Government ships via the Panama Canal, at rates to equalise conditions and give British Columbia a fair competitive opportunity on raw materials.

Cultivate the National Outlook

If we fail to obtain business after this, it is our own fault; but I would say to the Eastern as well as the Western Canadian—"Be a real Canadian! Do not think Canada stops at Toronto on the one end and Vancouver on the other." The British Columbia branch of the Canadian Manufacturers' Association is doing much educationally to improve relations and understanding between East and West—more power to it.

The proposed extension of the work of the Canadian Industrial Reconstruction Association is a sign of the times; but to be national in effect, this organization, claiming for its ideals national readjustment to the new conditions and better understanding between East and West, must understand that Winnipeg is not the West, and that if the Eastern manufacturer understands the grain grower and works with his associations, he can be indifferent to the balance of the West.

Here, certainly, lies a national danger. B. C. is fast becoming Americanized in spirit, and a feeling prevails that official Ottawa shirks its responsibilities here. I venture to state if a census were taken among

the younger generation in B. C. as to which country they would prefer to belong—U. S. or Canada—80 per cent. would vote U. S. You do not find this condition in Seattle. They are all for "U. S. A." But then their State gets wholehearted national consideration at Washington.

Finishing our own Products British Columbia cannot be a ship-building centre if Canada's policy continues to be one of wholesaling her natural endowment—raw materials. The policy of the Dominion must be the encouraging of finishing the product here. To this all manufacturers must add labour, skill, in the most acute sense, and art. By so doing we can further the justification of an extended and practical ship-building programme in Canada.

Broad Policy includes Small Shops and High Standard Work The shipbuilders in a Province like British Columbia, admittedly far removed from the more numerous manufacturing centres of the East, should adopt a broad policy and encourage small shops in their own centres that show a tendency towards progressiveness to specialize in everything contributory to the economical completion of a ship. A high standard of workmanship should be set, as in the days to come certain companies will have a good reputation, and a shrewd owner knows what a good job in the first place means in the economical operation of a ship.

The small shop system also distributes labour and saves concentration, for it is a well known fact that if once trouble gets a start in a very large yard, it is harder to handle than in an institution where there is at least some personal touch with the management. Opportunities of observation by an interested party are increased; while initiative, development of detail, and improvement of method of manufacture also have a better chance.

Despite difficulties in British Columbia It cannot truthfully be said that the shipyards of British Columbia are turning out ships as fast, in actual time, as the yards across the line; but there are no yards in the United States or Canada subject to so many difficulties as our yards in this Province. First, there is the distance from the steel mills, and all associated with that point to be considered, then there is the disadvantage of not being near enough to frequently add the personal touch to your correspondence; and as it stands today, with all steel coming from the States and subject to Washington's approval, this element cuts quite a large figure.

Vancouver holds a Proud Record Despite these and other limitations and difficulties, and while Canada in the past has not been known as a ship-building country, British Columbia need feel no shame as to her activities to date. The last city that official Ottawa ever expected to have the largest yard in the Dominion, was certainly Vancouver, and yet—it is a fact this proud record is held here, with the yard located on False Creek, and the last 8,800-tonner was launched in 63 days.

Indeed, this is not surprising, for anyone who has observed the activities and developments in other centres of commerce, and is free from local prejudice, cannot but be impressed by the possible opportunities of Vancouver, where the "Alaska," the first of many 8,800 tonners was built, and passed quietly out to sea—a credit to her builders, J. Coughlan & Sons and British Columbia. But this was not the first steel ship to leave Vancouver, for the "War Dog," the product of the Wallace Shipyards, had already gone to sea, and returned for another cargo.

Motherland Achievements in our Inspiration Examine the records of the great old world concerns and you will find men of great deeds and thoughts have been at their head. They were spending time and money in all directions as it related to the betterment of their industry. What was the result? They created a desire to build ships—good ships!—and when the nameplate went on it meant something, not only to the yard, but to the community where it was built, and to the country that is still proud—but in perhaps an over unobtrusive sense—to sing—"Rule Britannia."

And the original sacrifice and large outlook of these great men made it possible for Britain to bottle up the Germans in the Kiel Canal and sweep their fleet from the high seas. It was the industry and concentration of effort of those men that made it possible for our navy to be increased from 2,500,000 tons in 1914 to 8,000,000 tons in 1918! and their job was harder than ours at the beginning.

This mighty result should be an inspiration! If we cannot do things with a record like the foregoing to lead us, there surely must be dry rot within us. But, of course, we can. Let us believe in ourselves in the

"VULCAN" SCOTCH

Marine Boilers

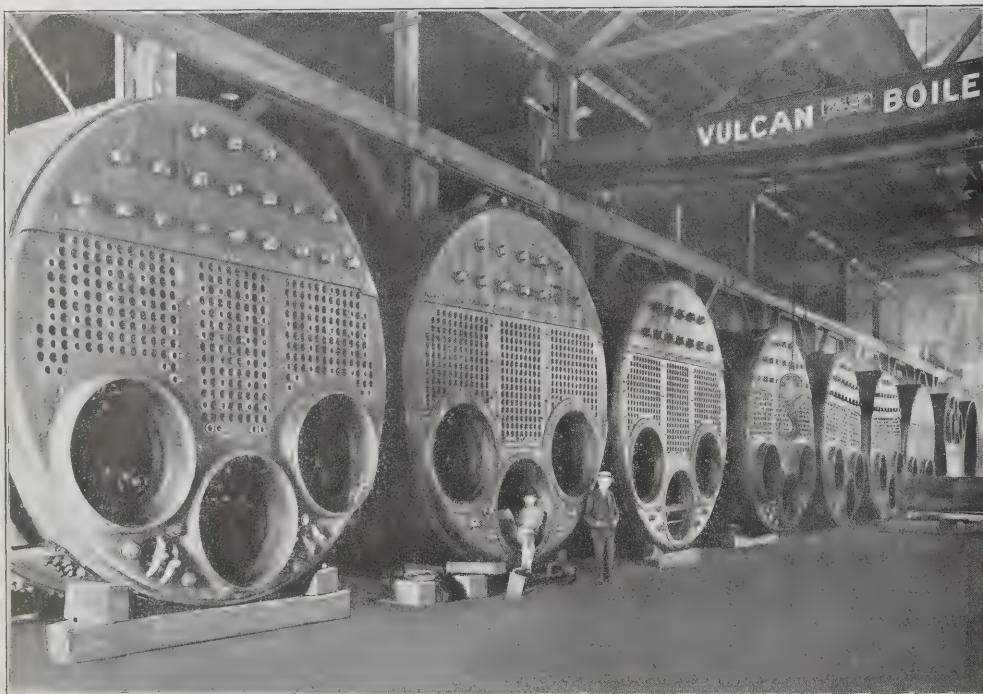
"Canada's Standard"

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Finished according to Clyde Standard



THE LINE OF QUALITY

Vulcan Iron Works Ltd.

Granville Island Works :: :: :: Vancouver, B. C.

big, active, striving, sacrificial way. Let us examine every handicap we have. Look the problem straight in the face. Keep on working. You never heard of an individual who pursued these methods being a failure, and the State is always a reflection of its inhabitants.

Another point we must consider is—that every accessory to a ship actually made here from our own raw material will help our rate of exchange.

An Example of Exchange Rate Let us suppose our rate of exchange with the United States is 2 per cent. (and our present methods are certainly contributing to that end) we should be handicapped by that percentage while doing business in open competition. Put the cost of a vessel at \$1,000,000 and assume the profit at 10 per cent., which is \$100,000. In the United

States the cost of the vessel would be \$900,000, everything else being equal, which, unfortunately, is not the case. In Canada, assuming the purchase of steel, etc., from the States to total \$400,000, it would be \$908,000. The balance of \$8,000 represents 8 per cent. of the profits of the American builder, or, in other words, he has an \$8,000 start on us before we lift a hammer. He also possesses the money, with generally quick thinking and acting management; and, to our loss be it said, British yard managers with just that thoroughness and knowledge they at first lacked across the line to carry out the "ginger" methods of the management.

--and the Remedy This can be remedied to a great extent by the successful operation of the rolling mill in Nova Scotia, but if that company does not give the Canadian builder a price that will offset at least the handicap of exchange, they are practically not getting anywhere.

Although dealing with exchange, let me say, parenthetically, that there are numerous other considerations which should not be lost sight of by this Company, but already their responsibility has been emphasized.

Educating Boys for Apprentices The business side of the industry should include the apprenticeship of a good class of boys. The Provincial Government should not lose sight of the value of the Industry to the Province, and with the development of Technical Schools to meet such need, should assist boys along right lines toward becoming competent and successful engineers and mechanics. To ensure the best results, teachers should be chosen from among practical experts direct from the shops. These instructors would then know the material they were working on, and be able to allocate boys according to their tendency.

As a corollary, the University of British Columbia should offer scholarships, which would have the effect of stimulating ambition and the desire to excel.

These suggestions, while capable of practical success, are only advanced as theories of my own, founded on some experience and thoughts on the subject.

Co-ordination and Co-operation as Procedure To achieve success in the Shipbuilding Industry in this Province, we must not depend on the Dominion Government programme alone. There should indeed, be rather a tendency to be independent of Government Contracts; an arranging of our business affairs to meet all competition, while an aggressive competitive spirit should be maintained: there should also be a co-ordination of effort in developing new ideas, with a common ground for research and business getting. Different companies should specialize in types.

The co-operation of Labour must also be obtained, and when all is said and done, the heart of Labour is all to the good. Be frank with Labour men; state your case clearly; ask their co-operation; show them facts as they affect them permanently, and they will toe the mark if they are loyal Canadians. If they are not, let them look elsewhere.

Dealing with the Labour Situation. The country which deals with labour conditions in the most intelligent way, and along advanced lines, having a full appreciation of the present unusual conditions, and a fair grasp of what the future will probably present, and handles same as it affects the Nation rather than allow individual communities to work in an isolated way with their own problems, should be found in the end not only to be the most efficient but the most progressive and contented. Canada should fight for this place, and British Columbia should not be found wanting in its contribution to the national effort.

**Government
Officials**

When Government officials are involved and design details are under controversy, they should get away from conventional methods, and practice a Dominion, rather than a Departmental, outlook. British Columbia builders also must be ready, under equitable conditions, to co-operate with officials and submit details with an effectiveness that counts. The Government should have a staff in British Columbia, competent to give definite and final rulings.

There must be a community perspective, a "putting of our house in order" to deal with every new condition; an appreciation of relative position geographically—not only from climatic standpoint, for in this we have the advantage, but in view of our isolation from the numerous larger Canadian centres. Progressive methods must also be employed in handling labour. The manufacturer must know what is going on elsewhere, and to attain that knowledge he should travel and see what the other man is doing; also his organizations should keep him posted.

**To believe in our-
selves helps
achieve success**

There should be no question as to the permanence of ship-building in British Columbia if we commence by believing in ourselves and have an exact knowledge of our resources, developing the latter intelligently and wisely to meet our needs, and recognising certain fundamental principles. Let us be fair with the Dominion Iron & Steel Co., whose volume will be ample to take care of our needs. We should not be visionary and talk about steel mills here. Rather agree to give them the mill and support their product, and demand from the Government—who helped create that mill, and are interested in its success—as much consideration in the national sense as they gave the steel company.

Let us awaken! Let us be true to ourselves, and we can accomplish great things if the personnel of our institutions have the elements of greatness. Let us cut out the nightmares of the past and get down to the business of the present. Let us have no more cheap politics, but carry out in practice the Hon. Ballantyne's statement that such would not enter into the Government's shipbuilding programme. Let us make "Efficiency with Honour" our war-cry and peace-cry; and again, let us believe in ourselves and our ability to do at least as well as any other country, for an admission to the contrary is not only a statement of personal inadequacy, but a reflection on the originality and resourcefulness of the whole Province. Let it be remembered that without perspective no country can become great.



B. C. MARINE, LTD.

TWENTY YEARS OF ADVANCEMENT

THIS business was originally constructed and owned by the B. C. Marine Railways Co., Ltd., of Victoria, and built about 1898. Mr. Geo. G. Bushby was local manager.

IN the early part of 1914 the parent company sold out to Yarrows Ltd., and the Vancouver Company formed and incorporated under the present name. July of the present year saw a change in the personnel of control: With the retirement of Mr. G. G. Bushby, his interests were purchased by Mr. Innes Hopkins, Mr. J. K. McKenzie and associates. Mr. Hopkins is now Managing Director; Mr. McKenzie, Superintendent; and Mr. C. J. Isted, Secretary.

ASOCIATED with this company is the Vancouver Forge Co., located on adjoining property. With the facilities offered by these two concerns, every class of Marine work, including hull and engine room repairs, can be handled with complete success.



PLANT AND EQUIPMENT

A Marine Railway, 250 ft. long, hauling capacity 1700 tons dead weight.

FULLY equipped Machine, Boiler, Carpenter, Blacksmith and Coppersmith Shops.

SEVEN hundred feet of wharfage extending out from high water mark.

FLLOATING equipment of 2 floating derricks, capacity of 10 and 7 tons, respectively.

STEAM Tugboat, Scows, fully equipped Diving Apparatus and experienced Divers.

THE largest Steam Hammer in British Columbia.

A 4,000-lb. Sellers Shipyard Hammer; a 2,000-lb. Nazel direct connected Air Hammer, and a 300-lb. Bertram Steam Hammer.

Office and Works

FOOT OF VICTORIA DRIVE - TEL. HIGHLAND 701 - VANCOUVER



THE

Victoria Machinery Depot Company, Ltd.



Dating back to the time when the first Transcontinental train reached the Coast, The Victoria Machinery Depot Co., Ltd., has since its inception been steadily growing and expanding until to-day it ranks as one of the most efficient Engineering Organizations on the Pacific Coast.



Largest Marine Railway

Possessing the largest Marine Railway in Victoria, one capable of holding a ship with a capacity of 3000 tons, as well as the privilege of using, when required, the large Government Dry Dock at Esquimalt, on which ships to a capacity of 8000 tons can be hauled, work which includes or necessitates the docking of vessels can be easily and efficiently handled.



Experts in All Branches

In order that the plant might be entirely self-contained, there have been built and are to-day in full running order, large Boiler and Machine Shops, Smithy, Foundry, Patternshop and all other necessary and component parts of a complete Engineering Organization, all equipped with the latest modernized and standardized machinery; and what is equally if not more import-



ant, efficiently manned and supervised by experts in all their particular branches. As a natural consequence, the Victoria Machinery Depot Co., Ltd., is enabled to undertake and complete Contracts of a very large and important nature.



Pioneers in Stern Wheelers

The Victoria Machinery Depot Co., Ltd. were the pioneers in building stern-wheelers for inland river service. They have also undertaken large contracts in the past, making repairs to numerous ocean going ships, overhauling and repairing the C. P. R. Pacific Coast Liners and included in the many important land undertakings completed, is the building of the Point Ellice Bridge, an undertaking of immense service and advantage to the City of Victoria. In these days

when the question of steel ship-building is to the fore, it is interesting to recall that the Victoria Machinery Depot has built many steel barges.



The Victoria Machinery Depot has also equipped quite a number of saw mills and logging camps, and the Company have shipped some of their products overseas to assist in clearing land in France.



Quite recently there has been installed a machine for welding tubes. Defective boiler tubes can now be welded and made as good as new, which, considering the present condition of the tube market, is of great advantage both from an economical and a productive standpoint.



Scenes of Industrial Activity

The works at the present time are taxed to the very limit to meet the pressing demands on their resources, and both by day and by night present an animated scene of industrial activity. Large and important Contracts, all of a war-time nature, are in the course of completion, including the building of Twenty Boilers, which when completed are to be installed in the ships now being built in Seattle for the Imperial Australian Government, the building of twelve boilers for the Imperial Munitions Board, the installation of boilers, engines and machinery in the new wooden ship, "War Haida," also for the Imperial Munitions Board; and many other contracts of equal importance, if not quite as extensive in nature or size.



Some two years ago when Shells were being made on the Pacific Coast for the Imperial Government, the Victoria Machinery Depot Co., Ltd., took an active part in pioneering what was at that time a very urgent war-time industry. Subsequently, however, through the requirements of the Imperial Government being supplied nearer to the actual seat of war, the demand for local made shells has practically ceased to exist.



Personnel of Control

The men responsible for the present state of industrial efficiency which the Victoria Machinery Depot Co., Ltd., has attained, include Mr. C. J. V. Spratt, President of the Company, whose father originally founded the concern, Mr. A. J. Bechtel, and Mr. Wm. Houston, Directors; Mr. R. R. Neild, General Manager, Mr. Wm. Brinkman, Chief Engineer, Mr. C. W. O'Neill, Secretary, and others who individually and collectively can be relied on to maintain that self same efficiency in the future to a degree unbeaten by any organization of a similar nature on the Pacific Coast.



Columbia Iron & Steel Company, Ltd.

Port Moody, B. C.

*The
Same Interests
Are Operating*

...The ...
Moody Rolling Mills Ltd.

And Manufacturing

MILD STEEL
MERCHANT BARS
TWISTED SQUARES
ANGLES

SHIPPING FACILITIES - - - SPUR FROM C. P. R. MAIN LINE

*Post Office
Port Moody.*

-:-

*Telephone
Port Moody No 2*

“Our Ships!”

To F. G. P.

From the Inlet broad next a winding shore,
To where False Creek bounds on the southern side;
Or anigh again, on Coquitlam's banks;
And, the Fraser yet—where Westminster ranks—
We are building ships for an Empire's store!
We are planning ships for Dominion's pride!

Where the long waves beat on Victoria's strand,
Near to Point Ellice by the sheltering rocks,
Where the slope spreads in to the harbour side,
And the pleasure craft in safe haven ride,—
We are building ships for an Empire's hand!
We are planning ships 'gainst a foe who mocks!

As our fathers built, so we build to-day,
With a timber firm, and a plate well set;
While the rivets' song as we drive will say,
“It's the same as sung by us yesterday.
We are building ships that will live and stay!
We are planning ships none shall e'er forget!”

When the War tale 's told, and the history writ,
And the proud hulls rest after duty done;
While the mizzen bears but a languid flag,—
And the harbour yawns, and the minutes drag,—
'Twill be well to know that we finished it
With a clear kept course to a Victory won!

*And the Ships of War, as they pass in line;
And the Transports safe o'er the surging brine;
And the Cargo Boats on their peaceful way;
With the Empire's Sons shall proclaim this lay:
“Side by side in rank we have crossed the foam,
Knitting heart and land—making Empire, 'Home'!”*

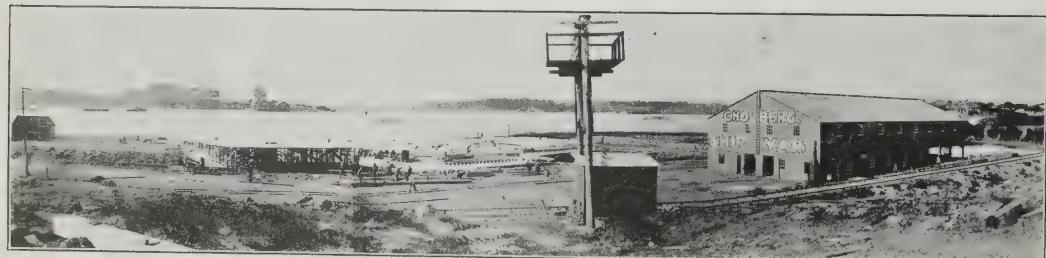
—BAT.

CHOLBERG SHIP YARD

VICTORIA : : : BRITISH COLUMBIA

THE proprietor of the Cholberg Ship Yard recently established in Victoria, B. C., is Mr. Christian Cholberg, a native of Molde, Norway, whose father, Johan Cholberg, operated a yard, building wooden vessels in that city for many years, and where Mr. Cholberg started in to learn the trade as a boy.

LIKE many of his nationality, he was not content with the somewhat limited opportunities afforded to an energetic young man in that kingdom at the time; he left his home town, and during the past twenty-five years, with short exceptions, when serving as junior officer of merchant ships at sea, has been engaged in the building of wooden vessels in various parts of the world, and especially on the Pacific Coast, having been many times disappointed with the methods used in wooden shipbuilding, both in the past, and at the present time. He was connected with one of the large yards in Victoria, building in wood, prior to his establishing a business for himself, which he did, under the name of "Cholberg Ship Yard," on July 25th, 1918; and, at the same time secured contracts for the building of several four-masted sailing schooners, from vessel owners of his own country, who were acquainted with him, and knew of his vast experience in that class of construction.



HE immediately set to work and negotiated for a site for a yard, covering several acres, on what is considered by many to be the very best site on Victoria Harbour; where he has proceeded to build a four-way yard, which is now well under completion, and on which the construction of the several vessels for Norwegian registry has commenced.

BEING a practical man, rather than a capitalist without a knowledge of shipbuilding, he is in no way dependent upon the direction of others, having worked himself at all of the various trades which are included within the boundaries of a yard building wooden vessels, and knows whereof he speaks upon all of the details pertaining to wooden construction. He is constantly "on the yard" himself, and having surrounded himself with a crew of experienced ship mechanics, is making rapid progress.

THE reputation of his father in the land of his birth, will, no doubt, stand him in good stead; and it is anticipated that orders from Norwegian purchasers with whom he is well and favourably known, will engage the capacity of his yard for a long time to come.

MMR. Cholberg is in no sense an exponent of the "rapid production" methods in vogue among some of the shipyards, and does not believe in seeking "records," with its attendant newspaper publicity. He is partial to the building of vessels of design to pass the Norwegian Veritas, which is the strictest in the world; vessels under its inspection being of the staunchest construction and commanding the highest prices.

Established 1835

Union Insurance Society of Canton, Limited

Established 1865

British Traders Insurance Company Limited

FIRE

MARINE

AUTOMOBILE

Western Canada Branch Offices:

309-313 YORKSHIRE BUILDING, VANCOUVER, B. C.



Where Are Our Sailors?

By E. H. BEAZLEY, MANAGING DIRECTOR UNION STEAMSHIP COMPANY OF B. C., LTD.

The British Columbia coast today is ringing with the metallic tap-tap of the pneumatic rivetter, and dozens of band saws are humming a deep note, whilst hundreds of men are toiling to produce the steel and wooden vessels of which the world stands in such pressing need. How long this industry will remain to us or the effect of its cessation it is not the part of this article to discuss, but be it ephemeral or lasting, there is one aspect of the question which is with us now.

Wanted! Our Own Sailormen. Almost every week sees a vessel put into the water, but who takes it to sea? The master, officers and engineers are sent out from Great Britain, the crews from China. Is it not a crying calamity that this great maritime province cannot produce sufficient sailors to man the products of her own industry?

What are the causes of this dearth of sailormen? We have a great fishing fleet and a considerable coasting fleet. Should not they be the nurseries of the deep sea sailor and fireman? One would imagine so. But the fact is that the gas engine has almost eliminated the sailor from the ranks of the fishermen, and the coasters have the greatest difficulty in getting even sufficient men to take the wheel. The men composing the deck crews of the boats are practically stevedores and roustabouts, who know no more about the sea than their fellow workers on the wharf, and who only differ from them in that they live on a vessel instead of on shore. They are paid from \$65.00 to \$80.00 per month, with board and lodging, and many of them make as much as \$30.00 a week overtime, so that the pay compares favourably with that received by more skilled workers on shore.

Necessary Discipline a Stumbling-block The fact must be faced that we out West here, at any rate, are not a maritime people. I believe the discipline on board ship, slight though it is on this coast, is the stumbling block. Numbers of our population have come out here from Europe to escape as much as possible from the bonds of discipline and convention, and they are wary of putting themselves under the orders of the autocrat of the quarterdeck. The same state of affairs existed and exists partially even now in the United States. They have solved the difficulty there by the draft, and are manning their mercantile marine with men trained and administered by their Navy. They found that it was impossible to maintain discipline in or control over their crews unless the executive officers had the power of the President behind them. In other words, they have discovered in time of war why they could not build up a mercantile marine in time of peace. There can only be one boss on a ship. Faddist legislation and trade union control prevented the development of the United States Mercantile Marine before the war. Will they be permitted to do so when the crisis is over and the United States owns probably the biggest merchant fleet in the world? I doubt it, therefore it behoves us to put our own house in order.

We Must Train Our Boys How are we to procure merchant seamen? It would appear that we must start with the boys. Imbue them with the spirit of the Navy whilst at school. Surely there is no more inspiring theme than the deeds of our sailors from the days of King Alfred up to the present time. Here is the great opportunity for the Navy League of Canada, and one which they intend to use to the utmost if their published propaganda can be believed. Train our boys for the sea. Interest them in its traditions and customs. Teach them the groundwork of a sailor. Accustom them to the discipline, self-abnegation and self-sacrifice which have made our Navy and citizen Army of today the glorious institutions that they are, and I venture to say that the disgrace of seeing Canadian-built ships manned by men of alien birth will ere long be a thing of the past.

The following extract may prove of interest, as showing the course adopted for the training of boys as sailors in Great Britain since 1910:

“Training for Our Greatest National Industry”

(Part of an article in the *Liverpool Courier*, September 28, 1918.)

UNOFFICIAL EFFORT FOR DECK BOYS.

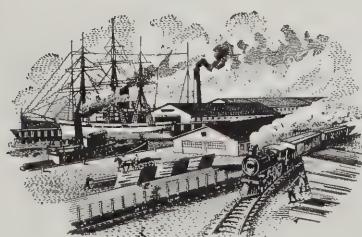
“ . . . In 1910, however, this very important national question was brought into the region of ‘practical politics’ by the constitution of the National Committee for the Training of British Seamen, under the chairmanship of Mr. Geoffrey Drage—formerly M.P. for Derby, and son-in-law of the late Mr. Ismay (founder of the White Star Line)—with the help of such well-known men interested in shipping as the late Earl Brassey, Sir Owen Philipps, Sir Thomas Royden, Admiral Henderson, and others foremost in public life like the Duke of Somerset, the Marquis of Graham, Mr. Hayes Fisher, Sir James Legard, Mr. Cyril Cobb, etc., etc. Various conferences were held, conclusions arrived at in consultation with naval and mercantile experts, interviews obtained with Government departments, and a start was made on the following lines:—

- “Official encouragement of training institutions off shore and ashore;
- “Entrance qualifications and a standard course;
- “Coast tenders to harden and experience boys for sea life;
- “Appropriation according to suitability for naval or merchant services;
- “Introduction to shipowners who would provide special berthing and supervision;
- “An allowance for preliminary training in qualifying for A.B.;
- “Housing and care when ashore from merchant ships.

SYSTEM OF TRAINING.

“In the pourparlers on the matter the following scheme of tuition was advised:—

“Knowledge of the compass; able to pull a good oar; semaphore and Morse signalling; steer a boat under sail; bends and hitches; knots and splices; take the wheel at a model; rule of the road; able to swim; drill and physical exercise; first aid; based largely upon the practice of such institutions as the Liscard Training Homes, and the Indefatigable on the Mersey, the Exmouth on the Thames, and others already producing excellent results, in which should also be mentioned the Sea Scouts, of Sir Robert Baden-Powell’s splendid movement.”





SHIP BUILDING



One of Vancouver's Great and Growing Industries

THE foreshore and harbour of Vancouver offers exceptional advantages for shipyard sites worthy of the investigation of any interests contemplating the establishment of shipbuilding plants.

Its geographical position with relation to trans-Pacific tonnage is strategical—its open harbour the year around, its extensive waterfrontage and its climate, favorable to outdoor work both summer and winter—are distinct advantages from a shipbuilding standpoint.

The Past

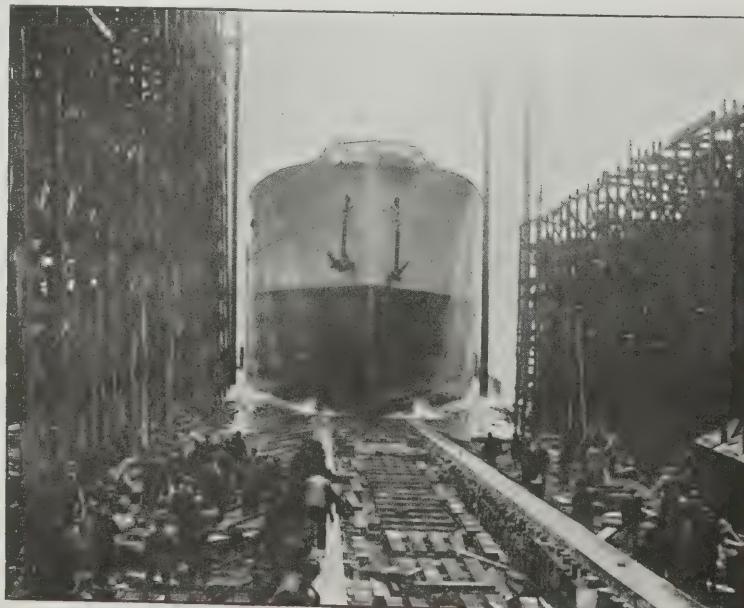
FOR years shipyards have been constantly operated in Vancouver, from which have been launched many vessels now engaged in coastal service.

The Present

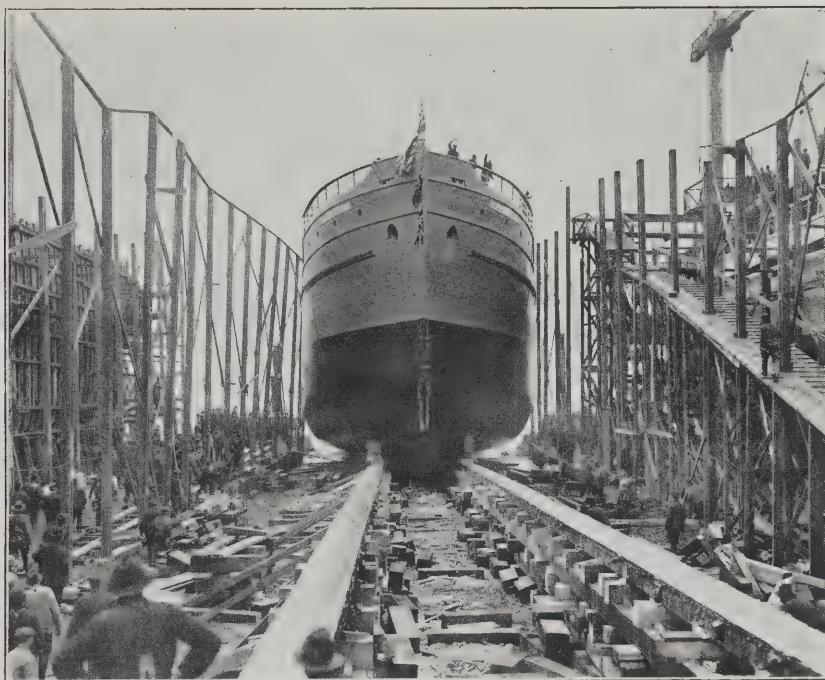
WITH the revival of Pacific Coast shipbuilding because of war conditions existing shipyards have been enormously developed and new yards of great magnitude established.

From these have been launched in the past two years the largest vessels ever leaving the ways of a Canadian shipyard.

The Vancouver shipyards have launched during the past two years over 100,000 tons of shipping. Included in this programme were five steel freighters of 8,800 tons, three steel vessels of 4,800 tons, 27 wooden steamers of 3,500 tons, and seven auxiliary power schooners.



Launching of the 8800 ton steel freighter War Camp, from the shipyards of J. Coughlan & Sons, False Creek, Vancouver.



Launching of wooden steamer War Puget, from the Lyall Shipyards, North Vancouver.

The Future **V**ANCOUVER shipyards are still working on unfulfilled contracts with reasonable assurances of steady work for years to come, so advantageous is their situation for meeting the demands of after-the-war shipping.

Hon. N. W. Rowell, a member of the Dominion Cabinet, recently said of Vancouver shipbuilding: "The development of your great shipbuilding industry should mean a **LARGE AND PERMANENT CONTRIBUTION** to the **INDUSTRIAL LIFE AND FUTURE OF BRITISH COLUMBIA**."

The Vancouver Sun, of Sept. 30, 1918, quotes a well-known financier as saying: "Nothing therefore, remains for the successful continuation of the shipbuilding industry but energy, public spirit and the judicious outlay of necessary capital, combined with the judicious handling of labor. A combination of all forces should enable an important industry to be firmly established in the Dominion, which is peculiarly fitted for such work, and which for the years of shipbuilding rehabilitation ahead of us is bound to play a prominent part."

Vancouver, as the Fourth city of Canada, the metropolis and industrial centre of the Canadian Pacific coast is well provided with engineering and machinery plants necessary in connection with shipbuilding.

Enquiries are invited from parties interested in shipbuilding on the Pacific Coast. A full investigation will be made along any suggested line and complete report presented. Address enquiries to

J. R. DAVISON

City Industrial Commissioner

Board of Trade Building

- 85697 -

VANCOUVER, B. C.

*Norway has no Fjords more impressive
Italy no waters more limpid
than the Northern Coast of British Columbia*



TRANSPORTATION—Is the friend of time, aiding his efforts to instil in us an appreciation of the fleeting moment; bringing before us in all the wonder of interest and surcharged beauty, some of the details which make the passing show of our existence.

TRANSPORTATION—Is the means of moving from interest to interest; from joy to joy; unfolding by such instrumentality the divinest works of nature, the most wonderful achievements of man.

TRANSPORTATION—To be ideal, must have certain aids such as comfort, ease, attendance, a touch of pretension, and a good culinary department.

TRANSPORTATION—To achieve perfection, must be the means of moving us from our ordinary surroundings to vistas ever fresh, ever new.

The Union Steamship Company

OF B. C., LIMITED

IS THE UNDENIABLE MEDIUM TO SUIT ALL NEEDS

Victoria :: Vancouver :: Prince Rupert



Bird's Eye View of the Union Dock, Vancouver. The popular place of embarkation for travellers to the Northern Coast. Easy of access and perfect in ticket and baggage arrangement.

TRAVELLERS Demand much in these days. The standard of production is so high that only the best media will serve those who travel. The perfect *entourage*, the silent, alert service—these are to be understood.

TRAVELLERS require other aids to perfect enjoyment. Jaded and tired after stress of mental and physical effort, they need repose. Surfeited with the year's humdrum labours, they demand change. Dried and withered by the scorching sun, cool air is an essential.

TRAVELLERS therefore look to transportation for relief from these recurring ills; and, so looking, seek the means to ensure in perfection those delights their friendly ally can provide, and they enjoy to the full.

Ten Vessels operating at regular intervals from Vancouver, visiting that Eighth Wonder

THE NORTHERN COAST OF BRITISH COLUMBIA

where rain and shine are alike beautiful in their expression of some mood of Nature; where rugged crag and foaming rapid change kaleidoscopically to the placid drawl of almost quiescent tide; edged by green verdure—and crowning all, a sky of dazzling blues and greys beneath the glory of which is Peace and Ease for Mind and Body.

The Union Steamship Company

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ESTABLISHED 1875

IMPERIAL BANK OF CANADA

CAPITAL PAID UP \$7,000,000

RESERVE FUND \$7,000,000



VIEW OF VANCOUVER HEAD OFFICE

J. M. LAY, *Manager*

BRANCHES:

FAIRVIEW

HASTINGS AND ABBOTT

J. S. GIBB, *Manager*

F. B. THOMSON, *Manager*

Head Office : : : : : : TORONTO

Ward's Agencies, Ltd.

ESTABLISHED IN REPUTE SINCE 1885

INSURANCE when handled by firms of established standing, and consequently placed with Corporations of unquestioned strength, becomes a double safeguard.

THIS is borne out by the case of Ward's Agencies Limited, originally founded as W. A. Ward & Co., whose Fire and General Insurance operations cover this Province and the Pacific Coast.

AGENCIES of note include the following:—

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FIRE, MARINE, AUTOMOBILE.

AMERICAN RELIANCE INS. CO. OF NEW YORK.
FIRE AND AUTOMOBILE.

L'UNION FIRE INS. CO., LTD., OF PARIS, FRANCE.

THE CANADA ACCIDENT ASSURANCE CO.

IMPERIAL GUARANTEE & ACCIDENT CO. OF CANADA.
NEW YORK PLATE GLASS CO.

NATIONAL work in the hands of Ward's Agencies Ltd., includes Marine Insurance for the Imperial Munitions Board.

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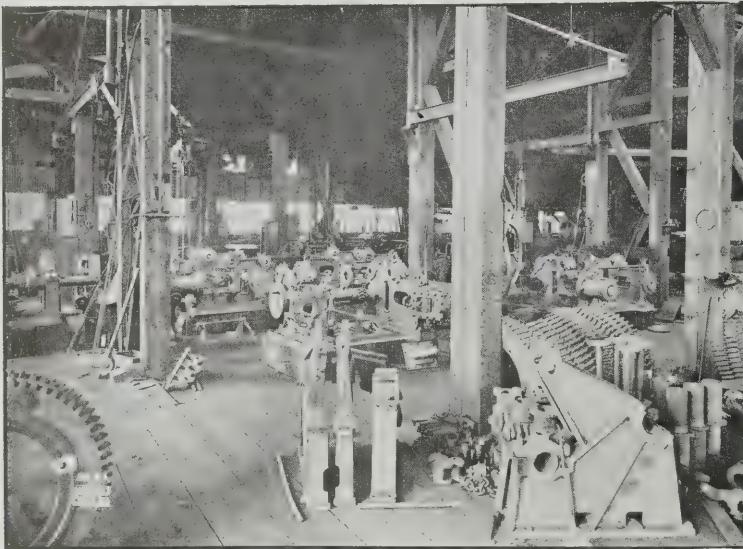
SEATTLE

... THE ...

North Shore Iron Works

Limited

North Vancouver



SITUATED on the North side of Burrard Inlet, these works enjoy exceptional shipping facilities, the wharf extending to deep water, while operations are conducted along 200 feet of water frontage.

CONSTRUCTORS of Windlasses, Winches, Boilers, Propellers, Castings, Etc.

DURING 1917 and 1918 have completed 76 winches and 35 windlasses for I. M. B. Wooden Shipbuilding Dept., 10 Steering Gears for Patterson Macdonald Shipbuilding Co., Seattle; 33 winches for J. Coughlan & Sons; and much general work for Wallace Shipyards, Ltd., Lyall Shipbuilding Co., Ltd., and the Imperial Munitions Board.

ALL STANDARD PATTERNS OF ALBION IRON WORKS IN STOCK

THE

INDUSTRIES of B.C. IN RELATION TO SHIPBUILDING



BY J. H. HAMILTON, EDITOR "INDUSTRIAL PROGRESS"

TWO short years ago in discussing the possibility of the establishment of the Shipbuilding Industry in British Columbia, a prominent manufacturer remarked, in speaking of the difficulties of the case, "Besides, what facilities have we here for the supply of machinery and equipment? Practically everything required in the building and fitting of a ship would have to be brought in from outside." This gentleman was one of those who told us that shipbuilding in British Columbia was "impossible," but, as often happens, those who said it could not be done were interrupted by somebody doing it!

It is a matter of pride to those connected with the industries of British Columbia to note how they have adapted themselves to the requirements of the shipbuilding industry which has sprung up in their midst within the past two years. Previous to the commencement of shipbuilding, the industries of British Columbia were dependent in the main on the development of the basic industries of the province, such as mining, lumbering, pulp and paper, fishing, together to a minor extent, with the manufacture of the domestic needs of the population in the matter of foodstuffs, clothing and so forth.

The scope and equipment of the metal-working plants of the province was very creditable prior to this period and many shops were well-fitted for the manufacture of machinery requisite in the mining and lumbering industries, in addition to the manufacture of marine engines of a small type used in fishing boats, and a considerable variety of structural and ornamental ironware, building hardware, boilers, nails, steel, iron and brass castings, and so forth.

The Value of Co-operative Effort Towards the end of 1915 a considerable stimulus was given to the metal trade industries in particular by the demand for shells, a majority of the more important plants were rapidly adapted to the manufacture of shell-cases for the Munitions Board, and the first lesson in the value of co-operative effort was learned. The advent of shipbuilding caused a rapid change in this respect, and the end of 1917 saw only a few shops still engaged on that work, the great majority being busy in the manufacture of auxiliary machinery, fittings and equipment to be used in connection with the shipbuilding programme of the province. The first vessels to be built in British Columbia under the stimulus of the world-wide tonnage famine were wooden vessels, as might be expected, and the lumber industry responded rapidly and satisfactorily to the demand for ships' timbers and planking, without placing any undue strain upon the facilities available. The building of wooden ships involved the establishing of a new industry in the production of ships' knees, hewn from solid timber. The auxiliary internal-combustion engines used in the schooners forming the earlier part of the shipbuilding programme were not of British Columbia manufacture, being brought from Sweden; but a considerable quantity of fittings, winches, bolts, capstans, etc., required in the equipment of these vessels, formed a useful apprenticeship for the machine shops of the Province, so that when the larger demand came for the equipment of steel vessels later to be built and the wooden steamers laid down by the Imperial Munitions Board, it required merely co-operative sustained effort to equip the shops for the production of the larger, more intricate machinery and fittings required.

Several of the steel vessels built in British Columbia have had their main engines designed and built in the province. Practically all the boilers for the ships have been built in British Columbia shops and with few exceptions, all the auxiliary machinery, hoisting engines, pumps, and fittings are of local manufacture.

This work has not been accomplished easily or without a considerable amount of co-operation and hard work, but the results attained will be of permanent value to the industrial capacity of the province, for it has demonstrated not only to the shipbuilding industry, but to the basic industries of the Province, what can be accomplished by local engineers and machinists.

Equipment Manufactured within the Province It is not within the scope of this article to review the actual equipment existing capable of producing shipbuilding supplies, but it might be mentioned that the whole of the propellers fitted to the twenty-seven steamers built by the Imperial Munitions Board were cast in British Columbia shops. Boilers, exceeding in size and capacity anything previously built in Canada, were made in local shops for installation in the steel steamers. Triple expansion engines for 5000 ton steel vessels have been designed and built locally and have won high praise for their efficiency in working. Ship's pumps, winches, windlasses, hoists, and similar equipment have been built locally and practically the whole of the wood fittings, life boats, and lumber used in the building of the ships, both wooden and steel, have been of local production.

As mentioned previously, the stimulus given to the manufacturing industries of the Province by the demands of the shipbuilding industry have been of incalculable value in their development, and it is safe to say that the facilities offered by the industrial establishments of the Province at the present time are far in advance, so far as shipbuilding is concerned, of anything believed practicable a couple of years ago.

The measure of present accomplishment makes it safe to assume that the firms responsible for what has been done in the past will be capable of responding to the future demands of the industry, whatever they may be.

The object of these short notes is to remove from the minds of those not cognizant of the facts the impression which may exist that "shipbuilding," so far as British Columbia is concerned, has meant merely the assembling of material and machinery, brought into the province from outside sources. Such is far from being the case, as has been shown above, and as the industry develops, less and less will it become necessary to import machinery or equipment entering the construction of vessels. While it cannot be discussed in the scope of the present article, there is reason to believe that within a few years, maybe within a few months, iron and steel industries will be developed in the province (the ore exists in enormous quantities) which will provide a cheap unfailing source of supply for steel plants and structural steel. While this is not at present a practical development, the advent will place the building of steel ships in British Columbia on a solid, permanent basis, irrespective of the exceptional demands of wartime and this is the ultimate object towards which all industrial interests in the province are working at the present time.

Important factors to be borne in mind as regards the future development of shipbuilding in British Columbia, are the relative cost and speed of construction. Ability to build, and to build well, have been demonstrated satisfactorily—but such alone would not warrant the assumption that the industry will be permanent, or will survive the period of tonnage stringency.

As regards the speed factor, while no records have been established so far in British Columbia yards, their accomplishments, "starting all cold," as engineers say, have been of no mean order, and with every ship built is gained more experience and improved equipment, both in the ship-yards and the engineering shops.

In the matter of cost, the problem as related to wooden ship construction must solve itself, for the Province is in an undoubtedly superior strategic position as regards timber for ship-construction. Labour is the main factor entering into the cost of shipbuilding which has been an uncertain element; but the agreements which have recently been arranged by intervention of the government have created a guarantee that wages will not outrun the legitimate level to which they are entitled by reason of fluctuations in living costs. British Columbia will thus be in a position to construct tonnage at least on an even basis with other Pacific Coast centres.



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DEVELOPMENTS BY SUBSCRIBING TO

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Association
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Progress of Shipbuilding Recorded Every Month

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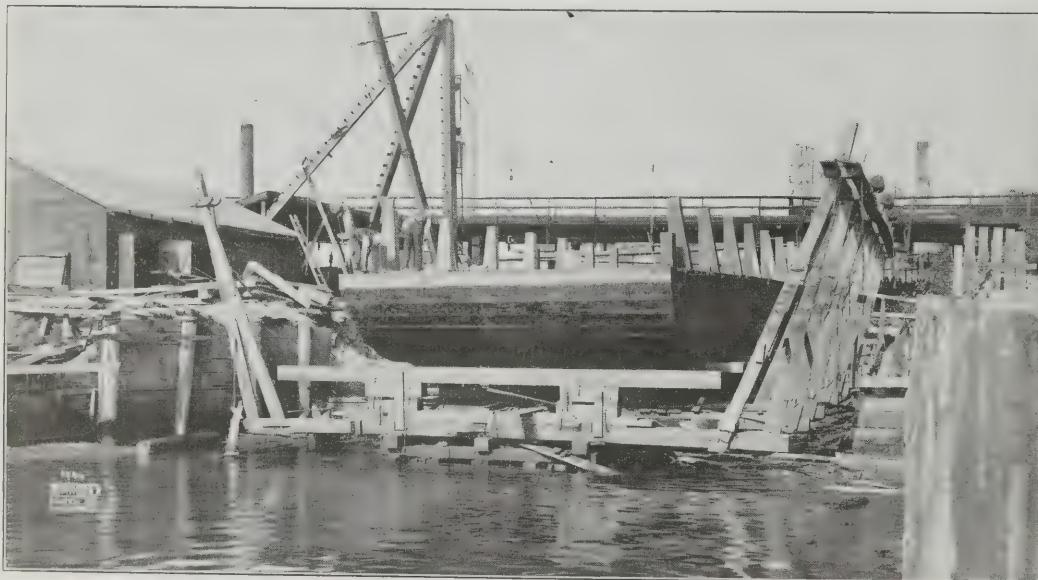
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and Yukon

Ritchie Contracting & Supply Company, Limited

SIITUATED on the immediate west side of Granvilles Bridge, on the False Creek fairway, these works are ideally situated for all purposes connected with marine activity. This same location was occupied by the Wallace Shipyards to 1910, when the Ritchie Company acquired the site.

THE water-frontage of over 300 feet affords scope for successfully operating the business of building scows, tug boats, and also general repair work on the same.



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The Painting of Ships' Bottoms



By L. DE MERRALL.

(*Western Manager The Martin-Senour Co., Ltd.*)

The old Lloyd's Rating of "A.1. Copper bottomed" for wooden vessels—the highest rating a ship of that type could receive—has to-day practically disappeared.

The tremendous demand for ships of all classes, both steel and wood, through submarine losses and the tremendously high cost of copper plates or sheeting, have made the "copper bottomed" ship a thing of the past.

Today ship builders and owners are all using paint to protect the bottom of wooden ships from the ravages of all those aquatic animals which attack and destroy the submerged part of these vessels so rapidly, as well as to prevent the growth of weeds and barnacles which would otherwise greatly retard the speed of the vessel.



Copper Sheetings as Used in the Past

The action on the copper sheeting as previously used was one of scaling. The copper plates being rolled had a laminated structure, and with the friction of the ship through the water and the action of the sea water itself, layers of copper would gradually wear off, taking with it any marine growths either animal or vegetable adhering to it.

These copper sheets would be good for from three to four years, at the end of which term, re-sheeting of the vessel's bottom would in most cases be necessary.

Paint, as a protective agent for the bottoms of wooden ships, has been used for a great many years, but there are few paint manufacturers who have successfully evolved a copper paint which will give real protection from the toredo worm, and keep the ship's bottom free of weeds and barnacles.



Copper Paints as Used Today

Those copper paints on the market today, which are most widely known, and which results have proved to be best for the painting of wooden bottoms plying in salt water, are composed largely of copper oxide and iron oxide ground in a suitable varnish, which will gradually wear away in a somewhat similar manner to the copper sheeting—any growth adhering to the surface washing off with it, thus keeping the bottom of the vessel clean and free from all destructive aquatic animals, and allowing the speed of the ships to be maintained, through the absence of weeds, etc.

Copper paint is not used on iron and steel ships as an anti-fouling paint, as galvanic action is set up between copper and steel or iron in conjunction with sea water, and corrosion of the plates rapidly takes place. Anti-fouling compositions for steel and iron ships are composed chiefly of oxide of iron and oxide or chloride of mercury ground in a suitable varnish.

The action of sea water converts the mercury into a corrosive sublimate, which kills all animal and marine growth that tries to adhere to its surface. The varnish in which the oxide of iron and the mercury are ground must be of such a nature as to wear gradually away, thus continually exposing fresh surfaces of bichloride of mercury with which to repel all animal and vegetable growth, and prevent fouling of the ship's bottom.



**Re-painting twice
yearly
Advocated**

The wearing action above referred to is caused principally through the friction of water against the ship's sides, and it therefore follows that a ship lying at anchor will foul much more quickly than when making passage. The bottoms of naval vessels and all ships operated by first-class companies are repainted at least twice a year, and if sailing very much in tropical waters, still more frequently—warmer waters being more favourable to marine growths.

It has been found that the loss of speed due to fouling after the paint has been subjected to wear over six months, increases very rapidly, and that the cost of repainting a steamship's bottom twice a year is more than offset in the saving of fuel alone.



The Perfection of Pure Paint !

A Glimpse at The Martin-Senour Products



To those whose interest lies in studying the latest and most effective aids in the construction of erections of wood, steel, and stone, there is always a leaning toward such products as have not only achieved popularity in the creation of a steady and increasing market, but retain and improve their position through perfection of workmanship or excellence of material.

The painting of a vessel, an engineering shop, or any building, whether of wood or other material, while bearing but a very modest share in the costing estimate, yet ranks most seriously when the duration of life with general wearing and appearance are taken into consideration. Hence the anxiety of the authority concerned, as to purity and kindred quality, in order that his works may be of value.

There can be little doubt these reasons and causes largely account for the popularity enjoyed by the Martin-Senour products, a popularity which evidences itself so strongly in British Columbia, as to create among the gossips a similar catch-phrase in "hundred per cent. pure" to that famous one of a cocoa firm "grateful and comforting."

The British Columbia branch of the Company is situated in Vancouver, and while thoroughly equipped to handle business of any size, is working at very high pressure this year; the steady growth of industrial business demanding the fullest attention, while Marine Contracts, such as recently received from the Coast Shipyards of Coughlans and Wm. Lyall's require still further activity.

Martin-Senour publish a number of most artistically designed catalogues and booklets dealing with their productions for all branches of the building world, and as these are forwarded on request from responsible parties, we need not elaborate the different sections of their business, further than stating that all Paints, Varnishes and other products supplied by this firm—whether for Marine, Sub-marine, Building—exterior or interior—Structural Steel or Iron, will at all times be guaranteed the acme of purity.

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Electrical DEVELOPMENT :: AS AID TO :: Shipbuilding



The British Columbia Electric Railway Company



There is one strategical point for the building of ships on the Canadian Pacific Coast, and that point is Vancouver. Not only do railways and the ocean here meet, but all the other factors for a successful shipbuilding undertaking are at hand. There is an abundance of cheap electrical power, cheap gas for rivetting, extensive industrial sites connected with electric railway lines, and ample facilities for tapping a wide-spread labour market.

The sea-coast available for shipbuilding is not confined to Vancouver alone. One ought to say Burrard Peninsula, because the shores of this 20-mile nose of land both on the Burrard Inlet side and on the Fraser River side are all potential shipbuilding sites.

On this huge area there is extensive development around Vancouver, Point Grey, South Vancouver and New Westminster. A large part of its development has been due to the B. C. Electric Railway Company, which operates 281 miles of electric railway in and around Vancouver, including 156 miles of interurban railway, and supplies a district 20 miles wide and 80 miles long, with electric power.

From its two power plants at Lake Buntzen, this company can send out 84,000 horse power, and numerous industries have sprung up as a result of its low rates. Concerning these rates, Dr. Adam Shortt, a commissioner investigating this company's affairs last year, said: "It must be admitted that the rates charged by the B. C. Electric for the larger quantities of power for commercial and industrial purposes are on the whole fair and reasonable These rates compare quite favourably with those of Seattle and other favoured centres."

The Vancouver Gas Company supplies gas at low rates, and the steel shipyards use this fuel practically exclusively for heating rivets and other work about the vessels.

Around the shores of False Creek and along the north arm of the Fraser river, there run the B. C. Electric interurban lines, handling a large amount of freight for the district. The company operates 60-ton electric locomotives on its own right-of-way, brings hundreds of water-front sites within reach of factories and lumber mills, and connects with steam railways.

The B. C. Electric Railway company is one of the largest public utility companies in Canada, having nearly \$50,000,000 invested in British Columbia. It employs a staff of experts who are able to advise ship-builders and other manufacturers on their power problems. The electrical drive is becoming so universal that the exclusive use of electric power in this industry is the logical way to increase output and help to win the war.

Vancouver is happy in affording an ideal home for workers in shipyards. The city car lines of the B. C. Electric not only bring men long distances to their work, but connect their residential districts with the magnificent parks and bathing beaches for which Vancouver is famous.

The whole lower mainland, served by the thoroughly up-to-date, progressive B. C. Electric Railway company combines as few localities do, all the necessary factors for making shipbuilding commercially successful—cheap power, cheap sites, deep water channels and comfortable homes for employees.



Electric Power in Shipyards



By JAMES LIGHTBODY

Electric power is being mobilized for shipbuilding and other industrial purposes today as never before. Such has been the impetus to industry on this continent, due to the war, that there is a serious shortage of power in numerous centres, and the federal government of the United States has devoted considerable attention to mobilizing the water powers of the country to get the maximum efficiency out of the country's resources.

The use of mechanical power on this continent has been carried to an unprecedented degree. In other fields of labour besides shipbuilding, far more power is used per man than anywhere else in the world, and statistics made up before the war show that the output of material on this continent is three times that of Great Britain, per capita.

Mechanical Power in the United States

In the automobile field, mechanical power has made the United States the largest producer of automobiles in the world, in spite of the fact that the highest wages are paid. So, it might be thought that the wages paid in this country would debar it from becoming a large builder of ships. But the widespread use of electric power such as is at hand will more than offset this.

In the great shipbuilding yards that have sprung up on this continent in the last year, the electric installations have been on an astounding scale. Every possible use is made of mechanical handlers of material. The fabricating yards far back in the interior use their electro-magnets for lifting, their electric cranes for hoisting the larger units, their electric arcs for welding, their electric furnaces, electric drills, and dozens of other electric tools.

Electric flood lighting has been mobilized to save man-power. Where dozens of watchmen ineffectually guarded plants against spies, great searchlights now make approaches to shipyards as light as day. No danger can lurk in the vicinity of the well-lighted shipyard.

In the yard itself, where ships are turned out in less than 40 days, electric light is making night work as efficient as day. Gangs of men start and quit at all times day and night, and under the efficient nitrogen-filled lamps, they do their part in winning the war, over here.

Electric railways are also playing a prominent part. Most of the 30,000 workmen at the Hog Island plant of the Emergency Fleet Corporation are transported by the electric railways of Philadelphia many miles to their homes. New tracks, new sub-stations and new cars were rushed to the yards, and no less than \$3,250,000 was spent on this branch of electrical development alone.

So great is the need for electric power in shipyards and munition factories in the States, that new power projects are being planned and financial aid given them by the federal authorities. But in order to save coal for the ships and for France and Italy, water power is being developed wherever possible. Not only that, but new steam installations divert energies in the boiler factories from the ships themselves. Every effort is being concentrated on making engines for the vessels, and to develop a steam plant means a lessened output.

Water Power in our Own Province

part of this is unused.

An abundant supply of electric power serves not only the shipyards themselves. Should steel and iron industries start up as subsidiaries to the shipyards, power will be a vital factor. In the wooden shipbuilding programme, electric power is playing a prominent part for dozens of sawmills around Vancouver and along the Fraser Valley are equipped with electric energy, with a great increase in efficiency.

The significance of having an ample supply of power ready for use will appeal to anyone who has had to establish an industry in virgin soil. While one's energies are devoted to setting up the main plant it is satisfactory to know that power has been provided for already, and that it is not necessary to lay plans and make arrangements for a private power supply.

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MARINE INSURANCE

AS AFFECTING BUILDING RISKS

By B. Dubois Phillips.

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The late Sir Joseph Walton, in giving judgment in a certain case, spoke of the Marine Policy in the following terms:

"The difficulty in this case arises from the very peculiar way in which contracts of Marine Insurance are expressed. A printed form which dates back to the eighteenth century is used as the basis of the contract. In this form there are certain blank spaces in which it is usual to insert a description of the subject matter of the insurance or of the special line of indemnity to be given by the policy. It not uncommonly happens that the words written in the blank spaces of the form have no connection with the printed words which precede or those which follow them. In almost all cases certain parts of the printed form have no application to the risk described by the written words. Sometimes it will be found that many even of the special clauses contained in printed slips gummed on to the policy have no possible application to the actual insurance. Cases are not uncommon in which the whole contract is contained in the written definition of the termini of the voyage and a few written words inserted below in some blank space in the form, none of the printed clauses of the form being applicable at all—the well known course of business in formulating contracts of Marine Insurance."

The layman, reading an indictment of this kind, naturally asks why, if such is the case, have not some steps been taken to remedy the trouble and draw up a form of policy that will be intelligent and intelligible. He is at once met with an almost insuperable objection—for the wording of the policy has one thing in its favor. By a series of legal decisions, some 2000 in number and covering a period of over one hundred and fifty years, the meaning and exact significance of every sentence, word and even comma of this hoary document has been ascertained so that it is now possible to read a Marine policy with a certain degree of confidence and enlightenment as to its actual meaning.

Ships and shipbuilding to the Underwriters mind naturally suggest Insurance, and the consideration of what is known as a Building Risk Policy may not be out of place in a publication of this nature.

In England shipbuilding has always been one of the basic industries and consequently Building Risk policies have always been a recognized form of Marine Insurance, but in Canada, where shipbuilding to any large extent has only been carried on since the war started, this type of policy has only figured to a very small extent in the general business of Insurance.

Prior to the war the usual method of placing Building Risk Insurance was on a Progressive Basis—that is to say, for the first month of construction a certain amount was insured representing approximately the work that would be completed during that time and so on during each month until the vessel was delivered to the owners. With the abnormal increase in shipbuilding during the past four years, this system was at once found to be too cumbersome and practically all building insurances are now placed on the completed contract price of the vessel, the rate of premium being calculated with reference to the amount of liability and the time at risk with the result that the cost under either system is much about the same. This has been brought down to a more or less definite basis, but it must always be borne in mind that marine insurance rates are competitive and not standard, so that at the best, until the insurance is actually placed, it is only possible to give an indication of the rate payable in any particular yard.

Now, in respect to the risks covered, the Building Risk policy is probably the most generous ever evolved by the Marine Insurance Fraternity. In addition to the risk of fire it covers loss or damage through Collapse of Ways from any cause, through fracture or breakage of shores blocking or staging, or of hoisting or other gear, and all risks of launching and trial trips as often as required. It also protects the assured against loss caused to other vessels by collision and against damage to harbors, wharves, piers and other similar structures.

All materials destined to be used in the construction of the vessel are included in the cover before they become part of the actual hull itself.

Furthermore, whilst under the ordinary hull policy a claim to be recoverable must as a general rule amount to 3 per cent. of the valuation, under the Builders' Risk Policy any claim, no matter how small, is payable.

The aspersions cast upon the ordinary form of Marine Policy by one of the leading English judges have already been referred to and also the fact that numerous legal decisions have rendered the policy intelligible. This, however, is not true of the Building Risk Policy. Claims may arise thereunder for the method of settlement of which there is no legal precedent, and it seems unfortunate that in drawing up this form of Insurance which is comparatively modern Underwriters could not have been a little more explicit in this respect.

Space does not permit the consideration of more than two of these points, and in discussing these certain axioms of Marine Insurance Law must be borne in mind.

First: That the valuation stated in the policy is in the absence of fraud binding on all parties.

Second: That in cases of partial loss Underwriters are liable up to the full face value of the policy irrespective of the percentage of loss shewn by a comparison of the amount of damage and the actual (as distinct from the insured) value of the boat at the time.

As stated above, the materials intended for use in the construction of the ship are covered under the policy. Assuming that a loss by fire occurs whereby the whole of the materials for a certain ship are totally destroyed, on what basis is the loss to be settled? Are Underwriters liable for the cost of replacing these materials at prices current after the fire, or having only insured the contract price of the vessel and materials, are they only liable for the cost of the materials on the basis of the contract price?

Taking the first alternative, it may be argued that the method of Adjustment should be the same as in the case of an ordinary Hull Policy on a completed vessel. Under such a policy if a fire occurred whereby the boilers, for instance, were totally destroyed, Underwriters would undoubtedly be liable for the cost of replacement and they could not maintain that their liability was limited to the proportion of the Insured value attaching to the boiler as a separate entity.

On the other hand, there would seem to be a perfectly legitimate argument that a Building Risk Policy is not in the same category as a Hull Policy, but is in reality a combination of an Insurance on Ship and Goods, the goods being represented by the materials before they are put into the Hull—that there are, therefore, in reality two separate insurances, the valuation in each instance being the contract price and that as in the case of a Partial Loss on a policy on goods, the amount payable by the Underwriters is the Insured Value of that portion—which is based on the contract or invoice price—so in the case of a Partial or Total Loss of materials under a Building Risk Policy the measure of indemnity is the contract price and not the cost of replacement.

A clause might easily have been inserted in the policy definitely stating Underwriters' obligations in such a case, but as matters stand, it would seem that the point will have to be decided by the Courts if a case arises where the method of settlement is seriously called in question.

Another point which may also have to come before the Courts for decision hinges on the question as to what constitutes a constructive Total Loss under a Building Risk Policy. Under an ordinary Hull Policy there is in English Law a Constructive Total Loss, when the cost of repairs exceeds the value—which by agreement in the policy is fixed as the Insured Value—when repaired, and under American Law when the cost of repairs amounts to 50 per cent. in some States and in others 75 per cent. of the Insured Value, and the assured is then entitled, if he so elects, to treat the loss as Total, and recover from the Underwriters the face value of the policy, turning over to them what remains of the damaged hull; or if he considers that it is more to his interest to do so, he can have the boat repaired recovering the cost from Underwriters up to the amount of the Insurance.

Now, let us assume that a builder makes a contract for the construction of a boat to cost \$1,000,000.00 and effects insurance on this basis, and that when the vessel is 50 per cent. completed a fire occurs. As a result of the fire two contingencies may happen:

1. The vessel may be very badly damaged, but still capable of being repaired.

In this case, he can either repair and recover from Underwriters the cost of the repairs, or he can presumably claim a Constructive Total Loss, provided he can prove that he is justified in doing so. Now to apply the test laid down above he must shew that the cost of repairs is greater than her value when repaired and he is at once confronted with the difficulty as to what value is to be adopted as the basis of comparison. Is it the value of the completed vessel or only of the portion destroyed? And if the latter what is the market value of a vessel only partially completed?

2. She may be so badly damaged as to have lost all semblance of a ship and reduced in fact to a mere heap of scrap iron or in other words, she is an absolute Total Loss. In such a case what is the liability of Underwriters? Should it be assessed on the basis of the Contract Price, the actual price of construction up to the date of the fire as shown by the assured's books, or on the cost of replacement?

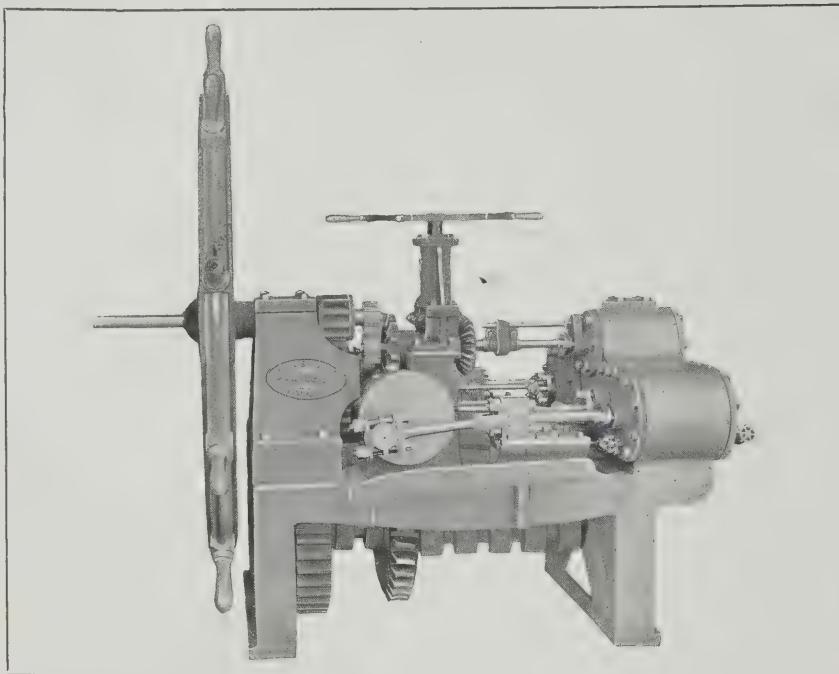
Equally cogent arguments could be advanced in support of either alternative, but so far as the writer is aware no legal precedent exists in favor of any particular method.

A clause could doubtless have been drawn up and incorporated in the policies setting aside any doubt on the subject, but Underwriters probably felt that it would be preferable to leave the question open until the Courts were called upon to decide what are the true principles of Adjustment in such cases.



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Developments in Concrete Barges and Ships

Brief resume of History of Concrete Shipbuilding—What Has Been Accomplished in the United States and Abroad

By J. E. FREEMAN

From International Marine Engineering, September, 1918.

It has generally been considered that the earliest use of what is today known as reinforced concrete was the concrete garden tubs constructed by Monier in the 1850's. But it is a fact that an earlier development in boat building by the use of cement mortar on a frame-work of rods or mesh was utilized by M. Lambot in 1849 in building his historic craft, the first concrete boat of which we have record. This boat was exhibited at a World's Fair in Paris in 1855, and was still seen in successful use as late as 1903.

This general method of cement plaster construction developed further in Holland, when a small sloop, the *Zeemew*, was constructed in 1887, to be followed in more recent days by barges of 50 or 60 tons capacity, many of the open hull type which are used on the Dutch canals for handling sand and gravel or disposing of ashes and other refuse. The *Zeemew* was reported last year in the possession of a ferro-concrete company at Amsterdam, still in good condition despite the fact that it had been in quite a number of collisions and had repeatedly been hauled up on a stone embankment and frozen fast every winter. One writer says it has been used many years for duck hunting in small bays, etc.

A recent article on the Holland work in Concrete and Constructional Engineering (London) contains this interesting statement—"careful examination of two concrete boats which had been in regular use for seven and eight years, respectively, showed that no growths occur, if the surface of the concrete is smoothed before launching. If the surface is left very rough, barnacles or algae may adhere to it. The smoothly finished concrete also reduces the skin friction of the vessel when moving through the water....."

A concrete pontoon serving as a landing stage for ferry-boats at Sydney, N. S. W., has seen severe service since 1914. During the discussion following a paper on concrete ships at a meeting of the Engineering Association of New South Wales last July, some interesting information regarding this pontoon was given by an engineer evidently connected with the Harbor Board, who said: "It measures 110 feet in length, 60 feet in width at one end and 70 at the other, the depth being 7 feet 9 inches. It has about 3 feet 6 inches of freeboard and displaces 783 tons. It is divided into 44 watertight compartments, firstly, to provide against the liability to be sunk by collision and, secondly, to stiffen it to withstand the continual shock of the ferry-boats when berthing. The sides, bottom and deck are 5 inches thick and doubly re-inforced; the bulkheads are four inches thick, and also doubly reinforced.

"This being the first of its kind built here and one of the largest afloat at the time anywhere, no risks were taken, and it is, perhaps, stronger than future experience may warrant. It is not a ship; it has to stand more severe usage than a ship would ordinarily experience, owing to the severe shocks often given by large ferry boats, which continue day after day to bump it while berthing."

We are all more or less familiar with the Italian barges built by Carlo Gabellini, among the early examples of which was the *Liguria*. Many concrete pontoons from the Gabellini yards have been built for bridges across the Po and other Italian rivers, and have required little maintenance though subjected to shocks from both vessels and ice. Doubtless this same yard had much to do with the construction of the concrete barges that are now being used by our Italian Allies for mounting naval guns of large caliber used in the defense of the Piave river line. Here is certainly good evidence of the strength of concrete under heavy shocks and vibration.

Our own country possesses today an interesting example of the Gabellini type of barge. In 1912, a group of men in Mobile built a barge about 90 feet long, 26 feet wide, and 9 feet deep, bringing over from Italy several engineers to supervise the construction. Doubtless owing to unfamiliarity of the owners with boat building and of the engineers with American conditions, this first craft was rather expensive and discouraged further operations, the barge remaining the sole example of their work. The barge was used for several years in handling coal, sand, etc., on the river, until driven ashore in a severe storm late in 1916, at which time a hole was punched in the side by a projecting pile or some such obstruction. Early this year

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the barge was repaired at small cost and turned over to a shipbuilding company at Pascagoula, Miss. The barge, though originally handling a deck load mostly, has now been carrying fuel oil in the hold—good evidence not only of the success of repairing concrete barges but of the practicability of concrete barges for the carrying of oil cargoes. This is all the more interesting in view of the present plans of the Shipping Board to construct a number of concrete oil tankers of 7,500 tons capacity and the projects of several private interests for a fleet of oil barges for the Mexican oil trade. Satisfactory results in the storage of fuel oil in concrete tanks and the greater knowledge now possessed of the requirements of concrete boat building make successful results all the more certain.

Concrete Barges

Concrete barge building has now been revived in the South—the first products being the two 550 ton barges that have been built by the J. W. Thompson Company near New Orleans, one of which is now in commission. These barges are 130 feet by 30 feet by 7½ feet at the center and 8½ feet at the rakes, drawing 2 feet 7 inches when light and 7 feet when loaded. Mr. Thompson in commenting on the first barge placed in service said:

"Concrete barge *Milo No. 1* with 450 tons gravel made her maiden trip yesterday. She showed no leaks at all. Handled better at loading dredge and towed steadier than our wooden barges. I vote her a real success."

Interesting progress photographs have been received of the 500-ton concrete barge being built by the Intercean Barge & Transport Company, at Seattle, and give a good idea of the general type of construction and arrangement of interior framing, reinforcement, etc. This barge is 116 feet by 34 feet by 10 feet in general dimensions with a load draft of 8 feet. The hull is divided into watertight compartments by one longitudinal and four cross bulkheads. These are 4 inches thick, while the sides, bottom and deck are 3½ inches. The barge has a weight of 350 tons, which gives a ratio of deadweight to displacement of about 60 per cent. Concreting is now completed after continuous operation from start to finish with the exception of a break at the deck line where a joint was made. It was reported that after over one hundred hours' continuous placing, the concrete gang stopped for five minutes to cheer the good ship *Faith* as she steamed up to Seattle on her maiden voyage—certainly a sufficient excuse for a few moment's delay.

In the East the 700-ton barge built by the Louis L. Brown Company has been launched, and other barges are now being built for the Navy Department, while there is every prospect of a large number of barges of this kind being built for service on the Erie Canal and other inland waterways. Concrete barges have proved their usefulness. The 200-ton *Pioneer*, built in 1910 for use on the Welland Canal, is still serving just as efficiently as when new, and has been subjected to severe tests. The barge has been loaded many times with carloads of rubble stone dumped from a height of 12 to 15 feet upon the concrete deck, the full load starting from one end, which procedure would doubtless make an oldtime wooden scow captain shiver. Answering a question recently in regard to the effect of loading stone thus, J. L. Weller, the designer and builder, has said: "The deck of the *Pioneer* is of 2½-inch concrete and has never been protected or covered in any way while stone was being dropped upon it. In probably half a dozen cases where a large stone dropped on its corner a dent was made on the surface; but this did not amount to anything and apparently has been patched up, as they are not noticeable, and the deck is now 99 per cent. at least, in as good condition as when built."

The need is great for river barges to handle coal. About 50 per cent. of the wood coal barges used on the Ohio River for this purpose were lost in the ice jams last spring. We have given some study to this problem and have worked out a tentative design for a 500-ton concrete barge that may be of interest to those studying the same subject. The displacement loaded is 680 tons, giving a ratio of deadweight to displacement of 70 per cent.

The barge has the same length and breadth as the wooden barge—i.e., 135 feet by 26 feet—and a slightly greater depth and is intended to be used in the fleets or separately as required. Results of experiments made by the Government and published in a bulletin "Experimental Towboats" indicated that for the draft and conditions under which this barge would be used the circular type of rake offered the least resistance in towing.

Brackets and cross beams 9 feet apart support the shell and top beams; but the brackets project only 2 feet inside, which should interfere little with loading or unloading. There are also longitudinal beams in the bottom, which is a double bottom for extra safety against sinking if the bottom is damaged and gives extra stiffness also. The shell is 2¾ inches at the bottom, decreasing to 2 inches at the top. The draft is 22 inches light and 6 feet 7 inches loaded (concrete 155 pounds). With the use of lighter weight concrete this could be reduced.

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BALFOUR, GUTHRIE & CO. WAREHOUSE, BURRARD INLET

Balfour, Guthrie & Co.

VANCOUVER, B. C.

The floor might be cast with the rest of the barge or made of pre-cast sections placed later, thus simplifying forms, a wedge-shaped space left between the edges of adjacent slabs over the beams containing strap iron anchors, which, when encased in the concrete filling the wedges, hold the floor slabs securely. The wedges could be cut out when necessary to replace individual sections, the edges of the slabs being coated with tar.

A barge somewhat similar to this type has been used on English canals for handling ashes, etc.

Progress in England and France

bank of the Seine. Here as many as 10 lighters about 125 feet long are under construction at a time, and production is said to average one vessel a week. The forms have been carefully designed not only to give the craft graceful lines, but to facilitate assembling and taking down, and, of course, are used repeatedly. It is stated that about 10 days' time is required to set the forms and place the reinforcement, and 2 days to place the concrete, working continuously. After forms are removed the surface is smoothed by rubbing. When the craft is to be launched a large crane picks it up bodily and places it in the water. This crane also serves a useful purpose in handling forms, etc.

T. J. Gueritte, the French engineer whose paper on concrete boatbuilding was published in the June issue of MARINE ENGINEERING, says: "The author has seen in what was 4 months before a bare field two 1,000-ton barges ready for launching and several others following closely." He further makes the interesting point that with concrete, alterations in the design in course of erection can be readily effected in building both barges and ships of concrete, which undoubtedly has its advantages in some cases.

James Pollock and Sons Company, of London, have adopted the use of straight lines wherever possible for the small coasting vessels now building, to simplify formwork, but the J. & B. Stewart Company of London and Belfast, which has completed recently a sea-going barge, followed the usual ship lines. The vessel was apparently constructed in a dry-dock or slip and launched by filling the dock, which is somewhat the same procedure as has been proposed by some in our own country.

The 125-foot concrete ship built by the Atlas Construction Company, of Montreal, and launched last November, is practically ready for service. This vessel is interesting because of the use of structural steel frames which were encased in concrete at the time the concrete shell was cast.

Work in Norwegian Yards

The Norwegian yards, which were among the first to build concrete ships for ocean service, are continuing their activities. The Fougner yard at Moss completed in March a 600-ton motor ship similar to the *Namsenfjord*, which is well known to shipbuilders, and is following this with 1,000 and 1,500 ton vessels, while the Fougner American yard is at work on concrete barges and several 3,500-ton ships. This company built the first floating dry-dock of reinforced concrete last year for a Christiania firm of yacht builders, the dock accommodating a vessel 75 feet by 25 feet and having a lifting capacity of 100 tons. The application of concrete to a floating structure of this kind is particularly interesting in view of the need for many floating dry-docks in connection with our rapidly expanding merchant marine. I understand that a company in San Francisco has about completed another floating dry-dock of concrete which has a capacity of 6,000 tons.

The Porsgrund Company, of Porsgrund, Norway, has also another lighter nearly complete similar to the 200-ton vessel launched last July, which is unique in that it was constructed and launched bottom up. The vessel was righted in the water by an ingenious arrangement of inner compartments whereby water was admitted to certain compartments, while others remained filled with air, thus an-balancing the craft so that it slowly turned over until it floated in correct position.

Concrete Steamer 'Faith' But it has remained for America to take the lead by the construction of the 5,000-ton concrete cargo steamship *Faith* on the Pacific Coast, and demonstrate that concrete was practicable for ocean-going vessels of large tonnage. It is tonnage of this class that we need now—this year—which by reinforced concrete construction can be supplied quickly and without interference to the construction of wooden or steel vessels.

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Our lead should be maintained and a comprehensive programme of concrete ship construction vigorously prosecuted. The attitude of our English Allies toward this matter is strikingly emphasized in a remark of one of the Admiralty officials concerning concrete ships, that "Every encouragement is being given by the Admiralty; newly formed yards have been laid down specially, while existing shipyards have been encouraged to form branch establishments for the purpose."

When the construction of this vessel was begun in September, 1917, many were beginning to realize the magnitude of the shipping problem, but few had given thought to the possibilities of concrete construction in solving that problem. The construction has been quite generally described in print and will be shown in the motion pictures, so I shall not dwell on that here.

The shipping problem had become more fully understood by the time the vessel was launched on March 14 and christened *Faith*, and the success of this launching attached greater interest and importance to the concrete ship.

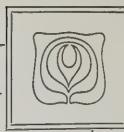
Early in May the *Faith* was completely fitted out ready for her trial trip—a record for such work on the Pacific Coast—and during the trials developed more than the designed speed of 10 knots which it was estimated the 1,750 horsepower engines would give.

The latter part of May the *Faith* took on her first cargo, salt and copper, and a few days later sailed for Vancouver via Seattle and Tacoma.

The maiden voyage of the *Faith* was as strenuous and severe a test as could be asked for in a concrete ship and she stood up under the gale, which at times put the decks awash, in splendid fashion, reaching Seattle—her first port of call—6 days after leaving San Francisco, in excellent shape, having taken in no water through the bottom.

Faith in concrete has again been justified. The application of a tried material to a known problem has again been accomplished. Concrete ships must be built in large numbers and with all possible speed to help answer the call for ships, more ships and still more ships, and win the war.





The Standard Shipbuilding Company

: Dominion Building :

VANCOUVER, B. C.

THIS firm has been long established, and under the able management of Mr. Donohoe has risen from the start to a point where it is now handling one of the largest single contracts for shipbuilding ever let to one company in British Columbia.



MR. PATRICK DONOHOE, N.A., is the man who applied for and has patents in the Donohoe Keelson, which is a method of reinforcement with steel, which will revolutionize wood hull construction. By the Steel Keelson method there is time saved in erection, as the steelwork can be assembled from templates and shipped knockdown to all portions of the globe. This form of construction, we may say, has received Lloyd's highest classification. Mr. Donohoe has ever been in the foreground where shipbuilding and the allied interests are concerned, and through systematic and business-like methods has built this firm up to its present standing and size.



A synopsis of their present undertakings may not come amiss, and are as follows:—

THE Standard Shipbuilding Company have on their hands at the present time a contract covering the building of twenty-one wooden vessels ranging from 3,500 tons deadweight to 5,000 tons deadweight.

THESE boats will be coal burning, and be of the Donohoe type with steel Keelsons, thus giving more carrying capacity.

THIS contract aggregates a total of \$16,250,000.00, and all vessels will be delivered before the end of 1919.

THIS Company for the handling of this contract has purchased 9 3/4 acres of land at Port Haney, and will put their plant in at this point, building their ships in pairs and launching sidewise.

Johnson Wharf Co.

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The above Firm has received contracts from the Imperial Munitions Board, for six wooden Cargo Steamers of the following dimensions:

250 ft. B.P. 43 ft. 6 in. Beam Moulded 25 ft. Depth Moulded.

Deadweight capacity, 2,800 tons.

The yard construction of these vessels commenced June 4th, 1917; and the first keel was laid on July 20th, 1917.

LAUNCHINGS:

S.S. WAR TATLA - May 23rd, 1918

S.S. WAR CASCO - July 4th, 1918

S.S. WAR NOOTKA - January 14, 1918 S.S. WAR CHILKAT - August 5th, 1918

S.S. WAR SELKIRK - March 6th, 1918 S.S. WAR TANOO - August 22nd, 1918

The last Ship was turned over to the Imperial Munitions Board, September 6th, 1918.



The Northern Construction Coy., Ltd., now have under construction 5 ships for the French Government, of the following dimensions:

196 ft. B.P. 39 ft. 8 ins. Beam Moulded 17 ft. Depth Moulded.
Deadweight capacity, 1,500 Tons.

ALSO Contracts for 4 Ships for the Belgium Government, of 3,200 tons deadweight capacity, dimensions:

276 ft. B.P. 46 ft. 6 ins. Beam Moulded 23 ft. 6 ins. Depth Moulded.

The work on these ships to commence immediately.

Officers of the Company { A. R. MANN, PRESIDENT AND GEN. MGR.
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Launchings from British Columbia Yards

January, 1917 to October 16th, 1918

Cameron-Genoa Shipbuilders, Ltd.

AUXILIARY SCHOONERS—

MARGARET HANEY	
LAURA WHALEN	- Mch. 24, 1917
JEAN STEEDMAN	
BEATRICE CASTLE	- Nov. 23, 1917
ESQUIMALT	
MALAHAT	

WOODEN STEAMERS—

WAR YUKON	- Jan. 24, 1918
WAR HAIDA	- Apr. 25, 1918
WAR SKEENA	- June 13, 1918
WAR STIKINE	- July 27, 1918

J. Coughlan & Sons

STEEL STEAMERS—

ALASKA	- Jan. 19, 1918
WAR CAMP	- Mch. 16, 1918
WAR CHARGER	- July 27, 1918
WAR CHIEF	- Aug. 19, 1918
*WAR NOBLE	- Sep. 28, 1918

Foundation Company of B. C., Ltd.

WOODEN STEAMERS—

WAR SONGHEE	- Dec. 27, 1917
WAR MASSET	- Apr. 11, 1918
WAR BABINE	- June 15, 1918
WAR CAMCHIN	- Aug. 31, 1918
WAR NANOOS	- Sep. 19, 1918

Wm. Lyall Shipbuilding Co., Ltd.

WOODEN STEAMERS—

WAR PUGET	- Feb. 26, 1918
WAR CARIBOO	- Apr. 10, 1918
WAR CAYUSE	- Apr. 27, 1918
WAR ACLIN	- May 11, 1918
WAR NICOLA	- June 24, 1918
WAR SUQUASH	- July 24, 1918

AUXILIARY TOPSAIL SCHOONERS—

J. N. GREENSHIELDS	- Sep. 25, 1918
ALICE BEAUCLERK	- Oct. 16, 1918

New Westminster Construction Co., Ltd.

WOODEN STEAMERS—

WAR COMOX	- Apr. 11, 1918
WAR EDENSAW	- June 8, 1918
WAR KITIMAT	- Aug. 24, 1918
WAR EWEN	- Sep. 26, 1918

Pacific Construction Co., Ltd.

WOODEN STEAMERS—

WAR TYEE	- Apr. 13, 1918
WAR SUMAS	- July 6, 1918

Wallace Shipyards, Ltd.

AUXILIARY SCHOONERS—

MABEL BROWN	- Jan. 27, 1917
GERALDINE WOLVIN	- Mch. 6, 1917
JESSIE NORCROSS	- Apr. 28, 1917
JANET CARRUTHERS	- July 21, 1917
MABEL STEWART	- Aug. 11, 1917
MARIE BARNARD	- Sep. 29, 1917

STEEL STEAMERS—

WAR DOG	- May 20, 1917
WAR POWER	- Mch 23, 1918
*WAR STORM	- Sep. 28, 1918

Western Canada Shipyards, Ltd.

WOODEN STEAMERS—

NOOTKA	- Jan. 14, 1918
WAR SELKIRK	- Mch. 6, 1918
WAR TATLA	- May 23, 1918
WAR CASCO	- July 4, 1918
WAR CHILKAT	- Aug. 5, 1918
WAR TANOO	- Aug 22, 1918

*The first double launching of deep-sea vessels in Canada: War Noble, 8,800 tons deadweight; War Storm, 4,800 tons deadweight.

The list of launchings does not include shallow-draught steamers built by Yarrows Ltd., for river service in Asia; or small vessels, such as power cargo boats, cannery tenders, tug-boats, etc., of which a number have been constructed and launched during the above period.

VANCOUVER
British Columbia

A. H. TIMMS
Printer
226-30 14th Ave. E.

